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DEPARTMENT OF ENERGY  
FEDERAL ENERGY REGULATORY COMMISSION

18 CFR Part 40

[Docket No. RM11-20-000; Order No. 763]

Automatic Underfrequency Load Shedding and Load Shedding Plans  
Reliability Standards

AGENCY: Federal Energy Regulatory Commission.

ACTION: Final Rule

SUMMARY: Under section 215 of the Federal Power Act (FPA), the Federal Energy Regulatory Commission (Commission) approves Reliability Standards PRC-006-1 (Automatic Underfrequency Load Shedding) and EOP-003-2 (Load Shedding Plans), developed and submitted to the Commission for approval by the North American Electric Reliability Corporation (NERC), the Electric Reliability Organization certified by the Commission. In addition, pursuant to section 215(d)(5) of the FPA, the Commission directs NERC to develop a modification to clarify the intent of one provision of the Reliability Standard. The approved Reliability Standards establish design and documentation requirements for automatic underfrequency load shedding programs that arrest declining frequency and assist recovery of frequency following system events leading to frequency degradation. The Commission approves, with modifications, the related Violation Risk Factors and Violation Severity Levels, implementation plan, and effective date proposed by NERC. The Commission also approves the regional variance

for the Western Electricity Coordinating Council in Reliability Standard PRC-006-1.

EFFECTIVE DATE: This rule will become effective **[insert date 60 days after publication in the FEDERAL REGISTER]**.

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SUPPLEMENTARY INFORMATION:

139 FERC ¶ 61,098  
DEPARTMENT OF ENERGY  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Jon Wellinghoff, Chairman;  
Philip D. Moeller, John R. Norris,

Automatic Underfrequency Load Shedding  
and Load Shedding Plans Reliability Standards

Docket No. RM11-20-000

ORDER NO. 763

FINAL RULE

(Issued May 7, 2012)

1. Under section 215 of the Federal Power Act (FPA),<sup>1</sup> the Commission approves Reliability Standards PRC-006-1 (Automatic Underfrequency Load Shedding) and EOP-003-2 (Load Shedding Plans). In addition, pursuant to section 215(d)(5) of the FPA, the Commission directs the North American Electric Reliability Corporation (NERC) to develop a modification to clarify the intent of one provision of the Reliability Standard. The approved Reliability Standards were developed and submitted for approval to the Commission by NERC, the Commission certified Electric Reliability Organization (ERO) responsible for developing and enforcing mandatory Reliability Standards. The approved Reliability Standards establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs, which are

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<sup>1</sup> 16 U.S.C. 824o (2006).

meant to arrest declining frequency and assist recovery of frequency following underfrequency events and provide last resort system preservation measures.

2. The Commission approves, with modifications, the related Violation Risk Factors (VRFs) and Violation Severity Levels (VSLs), implementation plan, and effective date proposed by NERC. The Commission approves the retirement of the currently-effective Reliability Standards PRC-007-0, PRC-009-0, and EOP-003-1, and the NERC-approved Reliability Standard PRC-006-0. Further, the Commission approves the regional variance for the Western Electricity Coordinating Council (WECC) in PRC-006-1.

## **I. Background**

### **A. Mandatory Reliability Standards**

3. Section 215 of the FPA requires a Commission-certified ERO to develop mandatory and enforceable Reliability Standards, which are subject to Commission review and approval. Once approved, the Reliability Standards may be enforced by the ERO, subject to Commission oversight, or by the Commission independently.<sup>2</sup>

4. Pursuant to section 215 of the FPA, the Commission established a process to select

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<sup>2</sup> 16 U.S.C. 824o(e).

and certify an ERO<sup>3</sup> and, subsequently, certified NERC as the ERO.<sup>4</sup> On March 16, 2007, the Commission issued Order No. 693, approving 83 of the 107 Reliability Standards filed by NERC, including Reliability Standards PRC-007-0, PRC-009-0, and EOP-003-1.<sup>5</sup> The Commission neither approved nor remanded NERC-approved Reliability Standard PRC-006-0 in Order No. 693,<sup>6</sup> which required regional reliability organizations to develop, coordinate, document and assess UFLS program design and effectiveness at least every five years. The Commission determined neither to approve nor remand this “fill-in-the-blank” Reliability Standard because the regional procedures had not been submitted, and the Commission held that it would not propose to approve or remand PRC-006-0 until the ERO submitted the additional information.<sup>7</sup>

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<sup>3</sup> *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, *order on reh’g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>4</sup> *North American Electric Reliability Corp.*, 116 FERC ¶ 61,062, *order on reh’g and compliance*, 117 FERC ¶ 61,126 (2006), *aff’d sub nom. Alcoa, Inc. v. FERC*, 564 F.3d 1342 (D.C. Cir. 2009).

<sup>5</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, at P 603, *order on reh’g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

<sup>6</sup> *Id.* P 1479.

<sup>7</sup> *Id.* PP 1477, 1479.

**B. NERC Petition**

5. On March 31, 2011, NERC filed a petition seeking Commission approval of Reliability Standards PRC-006-1 (Automatic Underfrequency Load Shedding) and EOP-003-2 (Load Shedding Plans), and the concurrent retirement of the currently-effective Reliability Standards PRC-007-0, PRC-009-0, and EOP-003-1, and the NERC-approved Reliability Standard PRC-006-0. The petition, as amended on May 17, 2011, states that PRC-006-1 establishes design and document requirements for UFLS programs that arrest declining frequency and assist recovery of frequency following system events leading to frequency degradation.<sup>8</sup> The petition states that EOP-003-2 makes minimal changes to EOP-003-1 by removing references to UFLS, which NERC describes as redundant in light of PRC-006-1, and instead focuses EOP-003-2 on undervoltage conditions.

6. The petition states that Reliability Standard PRC-006-1 achieves a specific reliability goal by establishing design and documentation requirements for automatic UFLS programs to arrest declining frequency, assist recovery of frequency following underfrequency events, and provide last resort system preservation measures. Further, the petition states that PRC-006-1 contains a technically sound method to achieve its reliability goal by establishing a framework for developing, designing, assessing and

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<sup>8</sup> The Notice of Proposed Rulemaking in this docket included a primer on UFLS programs generally. *Automatic Underfrequency Load Shedding and Load Shedding Plans Reliability Standards*, Notice of Proposed Rulemaking, 76 Fed. Reg. 66,220 (October 26, 2011), FERC Stats. & Regs. ¶ 32,682 (2011).

coordinating UFLS programs, and that PRC-006-1 is clear and unambiguous regarding what is required and who is required to comply with the Reliability Standard.

7. In the petition, NERC proposes VRFs and VSLs, an implementation plan, and an effective date. The petition requests an effective date for Reliability Standards PRC-006-1 and EOP-003-2 of one year following the first day of the first calendar quarter after applicable regulatory approvals with respect to all Requirements of the Reliability Standards *except* Parts 4.1 through 4.6 of Requirement R4 of PRC-006-1. With respect to Parts 4.1 through 4.6 of Requirement R4 of PRC-006-1, NERC requests an effective date of one year following the receipt of the generation data that would be required in draft Reliability Standard PRC-024-1<sup>9</sup> but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approvals of PRC-006-1.

**C. Notice of Proposed Rulemaking**

8. On October 20, 2011, the Commission issued a Notice of Proposed Rulemaking (NOPR) proposing to approve Reliability Standards PRC-006-1 and EOP-003-2 as just, reasonable, not unduly discriminatory or preferential, and in the public interest. The Commission proposed to approve PRC-006-1 and EOP-003-2 because the UFLS program addressed in the Reliability Standards is important to arresting declining frequency and

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<sup>9</sup> Draft Reliability Standard PRC-024-1 addresses “Generator Performance During Frequency and Voltage Excursions” and is currently being developed in the NERC standard drafting process.

assisting recovery of frequency following system events that lead to system instability, which can result in a blackout. The NOPR stated that the Reliability Standards are necessary for reliability because UFLS is used in extreme conditions to stabilize the balance between generation and load after an electrical island has been formed, dropping enough load to allow frequency to stabilize within the island. The NOPR concluded that PRC-006-1, in conjunction with the conforming changes to EOP-003-2, provides last resort Bulk-Power System preservation measures by establishing the first national Reliability Standard of common performance characteristics that all UFLS programs must meet.

9. The NOPR proposed to approve the related VRFs and VSLs, implementation plan, and effective date proposed by NERC. The NOPR also proposed to approve the regional variance for WECC in Reliability Standard PRC-006-1.

10. While proposing to approve Reliability Standards PRC-006-1 and EOP-003-2, the NOPR addressed or sought comments on the following issues: (A) impact of resources not connected to the bulk electric system; (B) validation of power system models used to simulate UFLS programs; (C) scope of UFLS events assessments; (D) impact of generator owner trip settings outside of the UFLS program; (E) UFLS program coordination with other protection systems; (F) identification of island boundaries in UFLS programs; (G) automatic load shedding in PRC-006-1 and manual load shedding in EOP-003-2; (H) elimination of balancing authority responsibilities in EOP-003-2; and (I) the “Lower VSL” for Requirement R8 and the “Medium” VRF for Requirement R5 of PRC-006-1.



11. In response to the NOPR, comments were filed by NERC and 12 interested persons.<sup>10</sup> The comments generally support the approval of Reliability Standards PRC-006-1 and EOP-003-2. The comments also provide information responsive to the questions raised in the NOPR. In the discussion below, we address the questions raised in the NOPR in light of the comments.

## **II. Discussion**

12. The Commission approves Reliability Standards PRC-006-1 and EOP-003-2 as just, reasonable, not unduly discriminatory or preferential, and in the public interest. The Commission's approval is consistent with the broad support for the Reliability Standards expressed in the comments. The UFLS program addressed in Reliability Standard PRC-006-1 is important to arresting declining frequency and assisting recovery of frequency following system events that lead to system instability, which can result in a blackout. Accordingly, the Reliability Standard is necessary for reliability because UFLS is used in extreme conditions to stabilize the balance between generation and load after an electrical island has been formed, dropping enough load to allow frequency to stabilize within the island. PRC-006-1, in conjunction with the conforming changes to EOP-003-2, provides last resort Bulk-Power System preservation measures by establishing the first national Reliability Standard of common performance characteristics that all UFLS programs must meet. For the same reasons, we approve the regional

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<sup>10</sup> A list of the commenters is provided in the Appendix.

variance for WECC in PRC-006-1. We also approve the VRFs and VSLs designated for the requirements of the Reliability Standards, with modifications, and the implementation plan and effective date, as proposed by NERC.

13. We address below the following issues raised in the NOPR in light of the comments received: (A) impact of resources not connected to the bulk electric system; (B) validation of power system models used to simulate UFLS programs; (C) scope of UFLS events assessments; (D) impact of generator owner trip settings outside of the UFLS program; (E) UFLS program coordination with other protection systems; (F) identification of island boundaries in UFLS programs; (G) automatic load shedding in PRC-006-1 and manual load shedding in EOP-003-2; (H) elimination of balancing authority responsibilities in EOP-003-2; and (I) the “Lower VSL” for Requirement R8 and the “Medium” VRF for Requirement R5 of PRC-006-1. Regarding the last issue, the Commission directs NERC to modify the “Lower VSL” for Requirement R8 of PRC-0061 and the “Medium” VRF for Requirement R5 of PRC-006-1 consistent with the discussion below.

**A. Impact of Resources Not Connected to Bulk Electric System Facilities**

14. Requirement R2 of Reliability Standard PRC-006-1 requires planning coordinators to identify islands to serve as a basis for designing UFLS programs. Requirement R3 addresses performance characteristics for UFLS programs. Requirement R4 requires each planning coordinator to conduct and document the assessment of its UFLS design and determine if the UFLS program meets the performance characteristics in Requirement R3 for each island identified in Requirement R2. The simulations outlined

in Requirement R4 all concern individual generating units greater than 20 MVA gross nameplate rating or generating plants/facilities greater than 75 MVA “connected to the bulk electric system.”

15. In the NOPR, the Commission stated that some generation meeting the 20 MVA and 75 MVA criteria in Reliability Standard PRC-006-1, Requirement R4 would not be modeled pursuant to Requirement R4 because it is not connected to bulk electric system facilities. The Commission explained that a resource not directly connected to the bulk electric system may serve load designed to be shed in a UFLS program. The Commission expressed concern that failure to account for resources not directly connected to the bulk electric system could result in planning coordinators being unaware of how those resources respond to underfrequency conditions. The Commission stated that if a planning coordinator is unaware of how these resources respond, it may plan to shed more load than is necessary for an area’s frequency to return to normal, which could cause an unintended overfrequency condition if the plan is carried out in the operating timeframe. These conditions, in turn, could cause the UFLS program to violate the performance characteristics specified in Requirement R3 of PRC-006-1. The Commission sought comment as to whether and how all resources required for the reliable operation of the bulk electric system, including resources not connected to bulk electric system facilities, are considered in the development of UFLS programs under Requirements R3 and R4 of PRC-006-1.

**Comments**

16. NERC agrees with the NOPR that failing to model qualifying generation not directly connected to the bulk electric system could affect the simulated frequency response. NERC, however, clarifies that Reliability Standard PRC-006-1 does not “establish parameters for what resources are modeled in [] simulations” and that “power system models used in UFLS assessments are generally the same models used in transmission planning assessments, which include models of all generation units and plants that meet the threshold size requirements even those not connected directly to the Bulk Electric System.”<sup>11</sup> In addition, NERC states that a standard authorization request is under development as part of the “second phase” of the project to revise the definition of bulk electric system, and information developed as part of that project could be used to assess whether any changes are needed to PRC-006-1.

17. EEI, TAPS, MISO, and FRCC maintain that the vast majority of qualifying generation is accounted for in Reliability Standard PRC-006-1. EEI comments that bulk electric system resources account for the “vast majority of resources within all interconnections” and supports the standard drafting team’s belief that the Reliability Standard generally captures about 95 percent of utility-owned installed capacity.<sup>12</sup> While EEI acknowledges that there are a small number of unaccounted for generation resources

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<sup>11</sup> NERC Comments at 4.

<sup>12</sup> EEI Comments at 2-3.

that meet the qualifying criteria, EEI comments that what is captured is sufficient for assessing reliable operation of the bulk electric system. EEI also maintains that planning coordinators already consider other resources as appropriate.

18. TAPS states that the “great majority” of generators are not set to trip before the underfrequency set points, so they will be available for UFLS programs.<sup>13</sup> TAPS contends that the only generators of concern are those that: (1) do not meet Reliability Standard PRC-006-1’s size and connection criteria; (2) trip prior to underfrequency set points; and (3) are dispatched during underfrequency events because they are not required to be modeled under PRC-006-1. TAPS maintains that the number of generators that meet these criteria is “very small” so that modeling them would have an “infinitesimal reliability benefit,” not improving the overall accuracy of the UFLS program design and not justifying the additional costs.<sup>14</sup>

19. MISO states that UFLS simulations should not be required to include all generation that meets the 20 MVA and 75 MVA criteria in Reliability Standard PRC-006-1, Requirement R4. MISO cites the standard drafting team’s belief that PRC-006-1 captures about 95 percent of utility-owned installed capacity.<sup>15</sup> MISO also

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<sup>13</sup> TAPS Comments at 4.

<sup>14</sup> *Id.* at 4-5.

<sup>15</sup> MISO Comments at 3.

maintains that the standard drafting team deserves deference and that simulations will always contain some degree of uncertainty.

20. FRCC states that generators that fall within the size requirements of Reliability Standard PRC-006-1 but that are not connected to bulk electric system facilities constitute a “very small amount.”<sup>16</sup> FRCC maintains that this amount is well below the error tolerance of a well-designed UFLS program and, thus, is not important.

21. SWPA states that planning coordinators, in developing UFLS programs, should consider all resources that are determined to be required for the reliable operation of the bulk electric system, regardless of whether those resources are directly connected to the bulk electric system.

22. NYISO comments that it analyzes UFLS effectiveness using a Multiregional Modeling Working Group dynamics model of the Eastern Interconnection, which includes all resources on the system regardless of bulk electric system connections.

### **Commission Determination**

23. In the NOPR, the Commission expressed concern regarding the development of UFLS programs that fail to account for qualifying generation not directly connected to the bulk electric system. We are satisfied with the explanations provided by commenters. First, we are persuaded by NERC’s explanation that Reliability Standard PRC-006-1 does not limit the resources that can be modeled in the UFLS assessments and that power

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<sup>16</sup> FRCC Comments at 2.

system models used in UFLS assessments generally model all qualifying generation, including resources not directly connected to the bulk electric system. In summary, although PRC-006-1 does not require all of the generation that is not directly connected to the bulk electric system to be included in the modeling, the subset of these resources that are required to assure that the UFLS models are sufficient to accurately predict system performance will be included. Similarly, we accept comments from EEI, TAPS, MISO, and FRCC that PRC-006-1 requires modeling of the vast majority of qualifying generation to ensure the reliable operation of the bulk electric system.

24. Like SWPA, the Commission believes that requiring all qualifying assets to be accounted for in UFLS programs, regardless of whether they are directly or indirectly connected to the bulk electric system, is useful to ensuring the effectiveness of the programs. Not requiring applicable entities to model sufficient amounts of qualifying generation indirectly connected to the bulk electric system could result in applicable entities not knowing how those resources react during underfrequency situations, which could cause excessive load shedding in an emergency and further contribute to system instability.

25. NERC states in its comments that this issue could be further evaluated in the “second phase” of the project to revise the definition of bulk electric system, and that information from that project could be used as a basis for revising Reliability Standard

PRC-006-1 if necessary.<sup>17</sup> Without prejudging those efforts, the Commission will not issue a directive requiring the modeling of qualifying generation not directly connected to the bulk electric system.

**B. Validation of Power System Models**

26. In the NOPR, the Commission stated that dynamic simulations that fail to accurately represent the power system can result in UFLS programs that are ineffective. The Commission, however, concluded that the UFLS program design requirements established in Requirement R2 of Reliability Standard PRC-006-1 and the required assessments established in Requirements R4 and R11 of PRC-006-1 are generally acceptable and include improvements over the current Reliability Standards.

**Comments**

27. FRCC comments that improving the accuracy of power system models used in simulating system response to forecasted system conditions is an appropriate goal, but achieving 100 percent accuracy is not practicable. EEI comments that dynamic simulations for any large power system will never be 100 percent accurate and asks the Commission not to impose any new directives which might unnecessarily increase costs to industry.

28. NYISO states that a lack of accuracy in modeling can have a significant impact on analyses of under-generated islands. Specifically, NYISO states that “optimistic models

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<sup>17</sup> NERC Comments at 5.



of unit governing response can lead to invalid conclusions regarding minimum frequency and frequency recovery.”<sup>18</sup> NYISO indicates that it is taking steps to improve the accuracy of modeling frequency recovery by, among other things, aligning the dynamics model to observed system response.

### **Commission Determination**

29. The Commission accepts the comments from EEI and FRCC that power system models with 100 percent accuracy are not practicable. The Commission, however, is mindful of the consequences of inaccurate power system models and their impact on an entity’s ability to accurately simulate system performance. As noted by NYISO, inaccurate models can lead to invalid conclusions which can be detrimental to the analysis and operation of the bulk electric system. At a minimum, the models should accurately predict system performance during UFLS events. Although entities may take additional steps, such as the step taken by NYISO to ensure accurate models, as stated in the NOPR, the Commission believes that the design requirements in Reliability Standard PRC-006-1 are acceptable.<sup>19</sup>

### **C. UFLS Event Assessments**

#### **1. Assessments in the Absence of Island Formation**

30. Requirement R11 of Reliability Standard PRC-006-1 requires planning coordinators to conduct assessments after a “BES islanding event results in system

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<sup>18</sup> NYISO Comments at 3.

<sup>19</sup> NOPR, FERC Stats & Regs, ¶ 32,682 at P 34.

frequency excursion below the initializing set points of the UFLS program.”

31. In the NOPR, the Commission expressed concern that the phrase “BES islanding event” could be interpreted to mean that a planning coordinator only has to assess an event if it meets both of the following requirements: (1) system frequency excursions fall below the initializing set point for UFLS; and (2) bulk electric system islands form within the Interconnection. The Commission explained that, if frequency falls below the initializing UFLS set point but islands do not form (e.g., because the event was not severe enough to isolate portions of the Interconnection, or UFLS or other protection systems failed to operate properly to form islands), an assessment of the performance of the UFLS program for this event is still useful because it can determine if the UFLS program operated as expected. The Commission sought comment on what actions must planning coordinators take under Requirement R11 of PRC-006-1 if an event results in system frequency excursions falling below this initializing set point for UFLS but without the formation of a bulk electric system island.

### **Comments**

32. In its comments, NERC states that “[a]lthough PRC-006-1 does not prescribe an analysis for [the non-islanding scenario identified in the NOPR], activating UFLS during an Interconnection-wide event would involve a significant loss of generation and analysis would be performed under the NERC Event Analysis program or the NERC Rules of

Procedure, depending on the severity of the event.”<sup>20</sup> NERC further states that the “activation of UFLS, while highly unlikely, would be a significant event requiring assessment of several aspects of system frequency, including system Frequency Response, equipment performance, and coordination of protection and control systems, in addition to the assessment of UFLS program operation.”<sup>21</sup> Ultimately, NERC agrees that an assessment of the performance of UFLS, even in the absence of island formation, is useful.

33. EEI and MISO agree with NERC that Requirement R11 of Reliability Standard PRC-006-1 requires both conditions (i.e., frequency excursion and islanding) to be met. MISO agrees with the NOPR that an analysis of excursions without islanding is useful. However, MISO and EEI comment that such an analysis is outside the scope of the Reliability Standard. MISO, quoting the NOPR, states that UFLS “is designed for use in extreme conditions to stabilize the balance between generation and load after an electrical island has been formed.”<sup>22</sup> Accordingly, MISO argues that a UFLS program “can only truly be assessed in light of its performance after an island has formed.”<sup>23</sup> In addition, such assessments are costly, time consuming and resource intensive, according to MISO. EEI maintains that entities “broadly perform assessments of lesser events as they deem

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<sup>20</sup> NERC Comments at 6.

<sup>21</sup> *Id.*

<sup>22</sup> MISO Comments at 4 (*citing* NOPR, FERC Stats & Regs. 32,682 at P 35).

<sup>23</sup> *Id.*

necessary.”<sup>24</sup> EEI contends that such assessments are not required in PRC-006-1 because “to do so would go beyond the intent of the program which is the design of UFLS programs.”<sup>25</sup> Instead, EEI notes that applicable entities normally conduct operational assessments regularly, and if an entity identifies a problem the entity would report the matter as a misoperation with an obligation to remediate. EEI also points to the draft NERC Event Analysis Process<sup>26</sup> and its application to what EEI describes as “underfrequency events of a lesser level” (i.e., events resulting in load shedding with a loss of load of 100 MW or more).<sup>27</sup> EEI contends that the Commission’s concerns regarding analysis of lesser events will be satisfied once the NERC Event Analysis Process is finalized.

34. SWPA states that it is reasonable for planning coordinators to request and analyze event data in the absence of island formation to assess the performance of UFLS programs. Specifically, SWPA comments that “[t]he assessment of a UFLS event during varying system conditions caused by generator outages, transmission outages, and

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<sup>24</sup> EEI Comments at 5.

<sup>25</sup> *Id.*

<sup>26</sup> We understand the NERC Event Analysis Process to be the same as the NERC Event Analysis program referenced in NERC’s comments.

<sup>27</sup> *Id.*

various maintenance activities, provides an opportunity to discover the impacts of these activities on the expected outcomes described in the plan.”<sup>28</sup>

### **Commission Determination**

35. NERC clarifies that Requirements R11 and R12 of Reliability Standard PRC-006-1 are triggered when system frequency excursions fall below the initializing set points for UFLS programs and bulk electric system islands form within Interconnections.<sup>29</sup>

36. The Commission agrees with commenters that it would be useful to have an analysis of system frequency excursions to assess the performance of UFLS programs even in the absence of island formation.<sup>30</sup> To that end, we agree with NERC that underfrequency events that result in the initializing of the UFLS set point, even in the absence of island formation, would be analyzed under provisions contained in the NERC Rules of Procedure and the NERC Event Analysis program.<sup>31</sup>

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<sup>28</sup> SWPA Comments at 3.

<sup>29</sup> NERC Comments at 6.

<sup>30</sup> NERC Comments at 5; MISO Comments at 4; SWPA Comments at 3.

<sup>31</sup> NERC Comments at 6. Section 807 of the NERC Rules of Procedure addresses “Analysis of Major Events” and Section 808 addresses “Analysis of Off-Normal Events, Potential System Vulnerabilities, and System Performance.” Separately, the NERC Event Analysis program, which is not incorporated in the NERC Rules of Procedure, as of this time is still under development. Compliance with the NERC Rules of Procedure is mandatory pursuant to section 39.2(b) of the Commission’s regulations and is enforceable by the Commission pursuant to section 39.9 of the Commission’s regulations. 18 C.F.R. § 39.2(b) (“All entities subject to the Commission’s reliability

## **2. Coordination of Assessments and Results**

37. Requirements R5 and R13 of Reliability Standard PRC-006-1 provide flexibility in coordinating UFLS design programs and event assessments among planning coordinators whose areas fall within the same island or whose areas are affected by the same event. In the NOPR, the Commission sought comments on whether differences in assessments between planning coordinators should be reported to reliability coordinators for resolution in the event that the process identified in PRC-006-1 does not resolve the differences.

### **Comments**

38. NERC, MISO, and EEI comment that reliability coordinators should not be tasked with resolving differences between planning coordinator event assessments. NERC states that differences between planning coordinator event assessments should not be reported to reliability coordinators because: (1) reliability coordinator's wide-area view may not coincide with island boundaries; (2) reliability coordinators may have conflicts of interest; (3) reliability coordinators may not have the tools to resolve the differences; and (4) reliability coordinators work in a real-time operating environment, which makes them ill-suited to resolve disputes among planning coordinators.

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jurisdiction under paragraph (a) of this section shall comply with applicable Reliability Standards, the Commission's regulations, and applicable Electric Reliability Organization and Regional Entity Rules made effective under this part."); 18 C.F.R. § 39.9.

39. MISO and EEI comment that event assessment differences should not be reported to reliability coordinators because planning coordinators are better positioned to reconcile differences. MISO notes that in some cases where an applicable entity is both a reliability coordinator and planning coordinator (as is the case with MISO), there would be a conflict of interest. Further, MISO maintains that referring disputes to reliability coordinators imposes additional costs with little to no benefit. MISO and EEI also contend that event assessment differences do not pose a risk to the reliability of the bulk electric system, with EEI noting that such differences are “a result of legitimate engineering and regional practices and processes.”<sup>32</sup> At most, EEI suggests that reliability coordinators might be used as informal facilitators.

40. SWPA states that a clear resolution process is necessary and that referring disputes to reliability coordinators is a reasonable consideration.

### **Commission Determination**

41. The Commission is persuaded by the comments of NERC, MISO, and EEI that differences between planning coordinator event assessments should not be referred to reliability coordinators for resolution. We share the concern of NERC, MISO, and EEI that referring disputes to reliability coordinators may create conflicts of interest because a planning coordinator may also serve as a reliability coordinator. We agree, however, with SWPA that disputes between planning coordinator event assessments should be

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<sup>32</sup> EEI Comments at 6.

resolved. Therefore, the Commission expects planning coordinators to work in good faith including, as appropriate, use of third parties to resolve disputes concerning event assessments. If the Commission finds that these disputes are not being resolved, the Commission may consider adoption of an appropriate process to ensure resolution of the disputes.

### **3. Assessment Timeline for Completion**

42. Requirement R11 of Reliability Standard PRC-006-1 requires planning coordinators to perform island event assessments within one year of an event. If the planning coordinator identifies program deficiencies, Requirement R12 of PRC-006-1 requires planning coordinators to conduct and document UFLS design assessments, which are meant to consider the deficiencies, within two years of an event.

43. In the NOPR, the Commission expressed concern that this time frame could be too long because island event assessments and consideration of deficiencies could reasonably be done in a shorter time frame. Moreover, the Commission noted that under PRC-006-1, deficiencies could remain within a UFLS program for two years from an event exposing the Bulk-Power System to instability, uncontrolled separation and cascading outages should a frequency event occur that the UFLS program mishandles. The Commission sought comments on the basis for the two-year time frame and clarification as to how soon after an event would an entity need to implement corrections in response to any deficiencies identified in the event assessment under Requirement R11 of PRC-006-1.



**Comments**

44. NERC comments that, while some events can be assessed in less time, one year is a realistic time-frame to assess performance for complex events and two years is a realistic time-frame to address identified deficiencies. NERC states that “the amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, as specified in Requirement R9 of PRC-006-1 . . . [and] [t]he time allotted for corrections will depend on the extent of the deficiencies identified.”<sup>33</sup>

45. EEI, MISO, and G&T Cooperatives support the timelines in Reliability Standard PRC-006-1. MISO maintains that event assessments are time and resource intensive and must not be rushed. EEI, MISO, and G&T Cooperatives state that planning coordinators can complete analyses of less complex events before the two-year deadline, but they need the maximum allowable time to finish analyses of complex events. With respect to the time allowed for correcting problems, EEI comments that any deadline in a requirement would be difficult to enforce and would not improve reliability given the variable nature of possible deficiencies.

46. SWPA states that an applicable entity may need to implement corrections that require complex procurement or acquisition processes, and such contracts can be complex, involving many required decisions and actions. Given these complexities,

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<sup>33</sup> NERC Comments at 8.

SWPA maintains that four years after event actuation is a reasonable deadline to implement corrections.

### **Commission Determination**

47. Based on the comments, the Commission is persuaded that two years to complete design assessments pursuant to Reliability Standard PRC-006-1 is appropriate. As noted by EEI, MISO, and G&T Cooperatives, assessments of complex events can be time and resource intensive. Thus, we agree that two years is a reasonable maximum allowable time for completion of design assessments. However, we agree with commenters that efforts should be made to complete assessments of less complex events before the two-year maximum allowable period.<sup>34</sup>

48. In response to the Commission's concern that Reliability Standard PRC-006-1 does not specify how soon after an event would an entity need to implement corrections in response to any deficiencies identified in the event assessment under Requirement R11 of PRC-006-1, NERC stated in its comments that:

The amount of time that a UFLS entity has to implement corrections will be established by the Planning Coordinator, as specified in Requirement R9 of PRC-006-1. The time allotted for corrections will depend on the extent of the deficiencies identified. The schedule specified by the Planning Coordinator will consider the time necessary for budget planning and implementation, recognizing that operating and maintenance budgets normally will not be sufficient to address major revisions and allowances will be

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<sup>34</sup> EEI Comments at 7; MISO Comments at 6.

necessary for inclusion of approved changes in budgeting cycles.<sup>35</sup>

Requirement R9 of PRC-006-1 states:

**R9.** Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. *[VRF:High][Time Horizon: Long-term Planning]*

Notwithstanding NERC's comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC's comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC's reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard. Within 30 days of the effective date of this Final Rule, NERC is directed to submit a compliance filing indicating how it plans to comply with this directive and a deadline for compliance.

**D. Generator Owner Trip Settings Outside of the UFLS Program**

49. In the NOPR, the Commission stated that Requirements 4.1 through 4.7 of Reliability Standard PRC-006-1 are intended to capture the effects of generators that trip prior to UFLS initiation. While agreeing that planning coordinators should consider

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<sup>35</sup> NERC Comments at 8.

generators that trip prior to underfrequency set points when developing their UFLS programs, the Commission sought comments on how generation losses outside of the UFLS set points (i.e., generators having trip settings prior to the UFLS underfrequency set points) should be accounted for in UFLS programs (e.g., generator owners who trip outside of the UFLS set points could procure load to shed to account for the loss in generation).

### **Comments**

50. NERC, EEI, TAPS, Dominion, FRCC and EPSA oppose requiring generator owners to procure load to shed for generators that trip outside of the UFLS set points. NERC states that it is appropriate for planning coordinators to consider generators that trip outside of the UFLS set points when designing UFLS programs, but it is inappropriate for planning coordinators to determine whether mitigation is necessary and who will be responsible for providing mitigation.

51. EEI states that Reliability Standard PRC-006-1, Requirement R4 requires that all resources included in the UFLS program that operate outside the specified trip settings be factored in to the dynamic simulation models used to develop the program. EEI further notes that, while there is no formal obligation for generator owners to supply trip setting data to planning coordinators, this information is shared. Unlike modeling generators that trip outside of the UFLS set points, EEI maintains that the issue of procuring load to shed to compensate for such trips is outside the scope of PRC-006-1.

52. TAPS comments that generators that trip prior to underfrequency set points are separately modeled under Reliability Standard PRC-006-1 and that this is the correct

approach to account for such generators. TAPS opposes requiring generator owners who trip outside of the UFLS set points to procure load to shed to account for the loss in generation. TAPS objects to a “one-size-fits all market/contractual solution” given the absence of a demonstrable reliability problem and the market power concerns it might create.<sup>36</sup> TAPS maintains that in some small islands it may be impossible to procure the necessary load to shed.

53. Dominion states that generator owners whose generators trip prior to UFLS set points should not be required to procure load to shed. Dominion contends that such a scheme could be extremely difficult to design and coordinate, and Dominion is unaware of any distribution provider or transmission owner tariff that offers such a service.

54. FRCC maintains that a small minority of generator underfrequency protection settings are above the minimum UFLS frequency set points and that in many cases any conflicts can be resolved by reexamination of the technical basis for the generator’s underfrequency protection. FRCC also states that requiring generator operators to procure load to shed would be technically impossible, and there is no market for compensatory, assignable UFLS to make generator contracts for load shedding feasible.

55. EPSA states that planning coordinators should consider generators that trip prior to underfrequency set points when collecting information and developing their UFLS programs. EPSA maintains, however, that requiring planning coordinators to account for

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<sup>36</sup> TAPS Comments at 7.

generators that trip prior to the UFLS set points presupposes that there is a material amount of generator losses occurring. EPSA believes that implementation of Reliability Standard PRC-006-1 will allow planning coordinators to gather information to determine the amount of losses, which can then be used to decide whether generator losses need to be accounted for. EPSA states that if generator losses are found to be a material concern that needs to be accounted for, the Commission should consider that: (1) generator owners do not and cannot play an active role in UFLS program decisions; (2) generator owners do not determine the set points for their generation; and (3) the NERC process should not be used to influence market decisions and competitiveness.

56. SWPA states that the design assessment in Requirement R4 of Reliability Standard PRC-006-1 addresses the modeling of generators having trip settings prior to the UFLS set points but that the Reliability Standard does not address how planning coordinators would resolve the need for supplemental UFLS. SWPA maintains that PRC-006-1 should include a requirement for planning coordinators to identify the UFLS entity that needs to provide supplemental UFLS, the basis for the identification, and coordination of this information with those entities and affected generator owners.

57. NYISO states that it conducts an annual survey of all generator owners within the New York Control Area for their UFLS trip setting and addresses those that have settings outside the UFLS program range established by the Northeast Power Coordinating Council (NPCC). NYISO states that it conducts a UFLS simulation that excludes non-conforming generation and a separate simulation that incorporates 260 MW of compensatory load shedding with tripping of non-conforming generation.

**Commission Determination**

58. Based on the comments, the Commission is persuaded to take no action to require compensation for generation losses outside of the UFLS set points (i.e., generators having trip settings prior to the UFLS underfrequency set points). Reliability Standard PRC-006-1 is an improvement because it requires planning coordinators to consider generators that trip outside of the UFLS set points when modeling and designing UFLS programs. We are persuaded by NERC's comments that it is appropriate for planning coordinators to consider generators that trip outside of the UFLS set points when designing UFLS programs, but it is inappropriate for planning coordinators to determine whether mitigation is necessary and who will be responsible for providing mitigation. For these reasons, we take no action to modify the Reliability Standard.

**E. UFLS Program Coordination with Other Protection Systems**

59. In the NOPR, the Commission stated that an integrated approach to the coordination of all types of protection systems (e.g., UFLS, undervoltage load shedding<sup>37</sup>), internally and externally to an entity's area, is required to be responsive to the 2003 Blackout Report.<sup>38</sup> The Commission noted that, while Reliability Standard

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<sup>37</sup> Undervoltage load shedding (UVLS) is automatic load-shedding that sheds load to prevent local area voltage collapse. See *U.S.-Canada Power System Outage Task Force, Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, at 92 (Apr. 2004) (Blackout Report), available at <http://www.ferc.gov/industries/electric/indus-act/reliability/blackout.asp>.

<sup>38</sup> Blackout Report at 159.

PRC-006-1 requires coordination of UFLS programs among planning coordinators in Requirements R5, R7, and R13, it does not appear to capture the same level of coordination with other protection systems as in Requirement R1.2.8 of PRC-006-0, which was approved by the NERC Board of Trustees but left pending in Order No. 693.<sup>39</sup> The Commission sought comments on whether and how coordination with other protection systems is or is not achieved under the new requirements.

### **Comments**

60. NERC states that Requirement R1.2.8 of PRC-006-0 includes a broad mandate and that the intent was to replace it with more specific requirements that are clear and measurable. NERC contends that Requirements R3, R4, and R10 of Reliability Standard PRC-006-1 include requirements for the coordination of UFLS programs with specific protections that “are part of or could impact the UFLS program.”<sup>40</sup> EEI and G&T Cooperatives likewise believe that Requirement R1.2.8 is vague, while PRC-006-1 contains the specificity to ensure that UFLS programs are adequately designed and coordinated. G&T Cooperatives maintains that coordination of UFLS and UVLS programs is already provided for in PRC-010-0, Requirement R1.1.1.

61. FRCC states that there is seldom a need to coordinate UFLS with UVLS and that the Reliability Standard PRC-006-1 correctly identifies the protection systems that

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<sup>39</sup> Order No. 693, FERC Stats. & Regs. ¶ 31,242 at PP 1477, 1479.

<sup>40</sup> NERC Comments at 9.



entities should coordinate with UFLS programs. FRCC contends that the potential for interaction between UFLS and UVLS programs is minimal given that UVLS schemes are not deployed throughout an interconnection and are, instead, deployed in specific locations that may be exposed to low voltage for a specific contingency. NYISO likewise states that, due to the distributed nature of UFLS, there should not be any significant interaction between fault clearing protections and UFLS and that under-voltage inhibition of relays is not expected to interfere with UFLS programs.

### **Commission Determination**

62. With regard to our concern raised in the NOPR regarding the coordination of UFLS with other protection systems, we are persuaded by NERC's comments that Reliability Standard PRC-006-1 provides an adequate level of coordination between the UFLS program and specific protection systems and controls that NERC identifies as part of, or could impact, the UFLS program.<sup>41</sup>

63. We are persuaded by NERC comments that "Requirements R3, R4, and R10 of PRC-006-1 address coordination of the UFLS program with other protection and control systems . . . includ[ing] generator protections that could respond to frequency and voltage excursions, automatic Load restoration, and equipment switching that may be included in

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<sup>41</sup> It may be appropriate to address an integrated approach to the coordination of all protections systems, as recommended by the Blackout Report, but that issue is outside the scope of this proceeding addressing Reliability Standard PRC-006-1.

the UFLS program to control voltage.”<sup>42</sup> Specifically, planning coordinators are to coordinate expected generation performance during underfrequency events and generator trip settings under PRC-006-1, Requirements R3 and R4.<sup>43</sup> To satisfy PRC-006-1, Requirement R10, transmission owners must provide the necessary automatic switching of elements as directed by the planning coordinator in the UFLS program and schedule.<sup>44</sup> To maintain the required system restoration capability required by PRC-006-1, Requirement R10, transmission owners must coordinate other protection system components with the established UFLS program components.

64. Additionally, the Commission notes that currently-effective Reliability Standard PRC-001-1 (System Protection Coordination) ensures system protection coordination for protection systems.<sup>45</sup> The Commission believes that this level of coordination between UFLS programs and other specific protection systems is adequate.

**F. Identification of Island Boundaries**

65. Requirement R1 of Reliability Standard PRC-006-1 directs planning coordinators to develop criteria to select areas that may form islands based on historical events and system studies. Historical events and system studies provide planning coordinators with the data necessary to determine where islands will occur based on the physics of the

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<sup>42</sup> NERC Comments at 9

<sup>43</sup> *Id.* at 9-10.

<sup>44</sup> *Id.* at 11.

<sup>45</sup> Reliability Standard PRC-001-1, Requirements R1 and R3.

system. Requirement R2.3 of PRC-006-1 allows planning coordinators to “adjust the island boundaries to differ from the Regional Entity area boundaries by mutual consent where necessary” to preserve contiguous island boundaries that better reflect simulations.

66. In the NOPR, the Commission agreed with the premise behind Requirement R1, which requires identifying island boundaries based on where they are likely to occur as opposed to following rigid Regional Entity area boundaries, because it should result in more effective UFLS programs. The NOPR also noted that NERC, in its petition, stated that Reliability Standard PRC-006-1 allows planning coordinators to “select islands including interconnected portions of the bulk electric system in adjacent Planning Coordinator areas and Regional Entity areas, without the need for coordinating this selection with Planning Coordinators in neighboring regions.”<sup>46</sup> The Commission observed, however, that Requirement R2.3 of PRC-006-1 requires “mutual consent” to adjust island boundaries from Regional Entity boundaries. The Commission sought clarification concerning the required degree of cooperation and/or “mutual consent” between planning coordinators under the proposed Reliability Standard.

### **Comments**

67. In its comments, NERC clarifies that “mutual consent” is required by part 2.3 of Requirement R2 of Reliability Standard PRC-006-1 when planning coordinators select island boundaries that do not coincide with the Regional Entity area or Interconnection

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<sup>46</sup> NERC Petition at 75-76.

boundary. NERC explains that, when a planning coordinator selects an island boundary that does not coincide with the Regional Entity area or Interconnection boundary, mutual consent must be obtained from neighboring planning coordinators to ensure that the deviation does not result in a portion of the bulk electric system being excluded from a UFLS assessment.

68. EEI states that the Reliability Standard PRC-006-1 requires “mutual consent” between affected planning coordinators and that the level of consent is voluntary and undefined to allow the parties to determine the level of cooperation necessary. EEI maintains that this scheme is necessary to ensure that all parts of the bulk electric system are covered within a UFLS plan.

69. MISO states that planning coordinators should be able to study islands as they see fit and without the consent of neighboring planning coordinators, which includes studying islands that deviate from Regional Entity boundaries. MISO maintains that there is no detrimental effect associated with multiple or non-coordinated island studies.

70. NYISO comments that it regularly conducts stability evaluations on a New York Control Area and regional basis and is aware of the potential breakpoints on the system.

71. EPSA states that UFLS programs are best developed on an interconnection-wide basis, not on a regional basis. EPSA notes that region-specific Reliability Standards could undermine Reliability Standards PRC-006-1 and EOP-003-2 if they do not address interregional coordination among planning coordinators.

72. PSEG states that it has concerns with the active draft regional versions of PRC-006-1 pertaining to Reliability *First* Corporation and NPCC. PSEG maintains that

these regional versions will hamper needed interregional coordination for UFLS program design in the Eastern Interconnection (i.e., the proposed regional standards do not require interregional coordination among planning coordinators and may require planning coordinators who span multiple regions to follow different standards); they violate a key NERC market principle by requiring existing generator owners to procure offsetting UFLS for the early tripping of their generating units if these units cannot meet specific performance requirements; and they may contravene the Energy Policy Act of 2005<sup>47</sup> by placing NERC and the regions in the role of imposing generation adequacy requirements. PSEG maintains that UFLS is an interconnection-wide issue and should be addressed on an interconnection-wide basis.

### **Commission Determination**

73. The Commission accepts NERC's clarification of the level of consent required between planning coordinators to adjust island boundaries under Reliability Standard PRC-006-1, Requirement R2.3. As stated in the NOPR, we believe that the reliability of the bulk electric system benefits from entities basing their studies on physical characteristics, as allowed in PRC-006-1, as opposed to hewing to artificial boundaries.<sup>48</sup> To the extent MISO suggests in its comments that planning coordinators should not have to reach a consensus with neighboring planning authorities when adjusting island

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<sup>47</sup> Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005).

<sup>48</sup> NOPR, FERC Stats & Regs. ¶ 32,682 at P 46.

boundaries, we disagree. As NERC and EEI explain in their comments, it is important to coordinate adjustments in island boundaries to ensure that no part of the bulk electric system is inadvertently left unstudied.<sup>49</sup> However, nothing in PRC-006-1 precludes entities from conducting additional assessments based on any island boundaries they wish to analyze.

74. With respect to the comments from EPSA and PSEG, there are no Regional Reliability Standards currently before us in this matter and, therefore, the matter is not ripe for us to address.

**G. Automatic Load Shedding and Manual Load Shedding**

75. In the NOPR, the Commission observed that there are no requirements in Reliability Standard PRC-006-1 to coordinate automatic load shedding by UFLS and manual load shedding under Reliability Standard EOP-003-2. The Commission noted that once load is disconnected from the system, either automatically or manually, it cannot be used again to arrest frequency decline. The Commission expressed concern that in the event that a load resource is double-counted and removed during automatic UFLS, the manual load shedding cannot be completed if called upon. Accordingly, the Commission stated that resources allocated to each type of load shedding (i.e., automatic and manual) should not overlap. The Commission sought comments on how the

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<sup>49</sup> NERC Comments at 12; EEI Comments at 10.

coordination of automatic and manual load shedding is considered in light of the fact that the Reliability Standards do not explicitly require coordination.

### **Comments**

76. NERC acknowledges that the Reliability Standards do not explicitly require coordination of manual load shedding and UFLS but states that Reliability Standard EOP-003-2 addresses the concern that a load resource could be unintentionally double-counted. Specifically, NERC maintains that Requirement R6 of EOP-003-2 requires transmission operators and balancing authorities to include load in the manual load shedding program that is not included in the UFLS program to achieve the reliability objective of EOP-003-2.<sup>50</sup>

77. Wisconsin Electric and FRCC state that it is difficult for a UFLS program not to overlap with manual loadshed plans. Wisconsin Electric comments that it is “overly conservative to prevent a load from being used in both a UFLS program and a manual loadshed plan.”<sup>51</sup> Wisconsin Electric also observes that a reliability coordinator may require an entity to manually shed load that is part of a UFLS program, which the entity cannot ignore. FRCC maintains that a non-overlap rule is likely to have a negative impact on reliability because it may reduce the amount of load available to address

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<sup>50</sup> NERC Comments at 12.

<sup>51</sup> Wisconsin Electric Comments at 3.

capacity emergencies. FRCC further contends that underfrequency events are rare and it is even less likely for an underfrequency event to coincide with a capacity emergency.

78. Dominion states that the Commission should not force coordination of manual load shedding and UFLS load shedding because it would prevent balancing authorities and transmission operators from using currently available tools to manage emergency conditions. Dominion contrasts the precision of manual load shedding with the widespread automatic response provided by UFLS programs. According to Dominion, forced coordination could remove manual load shedding from the emergency response toolkit for local issues, which, according to Dominion, could allow them to turn into cascading events. EEI states that the purpose of UFLS programs and manual load shedding are separate. EEI argues that, while a broad understanding of the operation of each program is important, coordination to the level implied by the NOPR serves no purpose since each program addresses different problems. EEI further notes that coordination in the form of “information sharing” already occurs. NYISO also states that manual load shedding and UFLS address different issues and should be addressed in separate Reliability Standards.

79. SWPA states that there is a need to address what consideration planning authorities give to other protective schemes and remedial action plans. SWPA maintains that Reliability Standard PRC-006-1 should address how a balancing authority and transmission operator address overlap concerns where most of its balancing authority area entities are subject to load shedding plans under Reliability Standard EOP-003-2 but these loads are also subject to UFLS plans under PRC-006-1.



### **Commission Determination**

80. Based on the comments, we find that there is an adequate level of coordination between UFLS and manual load shedding. We are persuaded by NERC's comments that the term "additional load" in Reliability Standard EOP-003-2, Requirement R6, includes resources allocated to manual load shedding that are not included in the UFLS program. UFLS and manual load shedding programs are developed separately and have, as EEI stated, separate purposes. As such, to avoid insufficiencies in available load if manual load shedding is needed after UFLS has been activated, UFLS and manual load shedding programs cannot be planned to shed the same load.

### **H. Elimination of Requirements for Balancing Authorities in EOP-003-2**

81. In the NOPR, the Commission observed that Requirements R2, R4, and R7 of the currently-effective Reliability Standard EOP-003-1 apply to transmission operators and balancing authorities but that Reliability Standard EOP-003-2 eliminates balancing authorities from Requirements R2, R4, and R7. The Commission sought clarification as to why these balancing authority responsibilities were not incorporated into Reliability Standards PRC-006-1 or EOP-003-2. The Commission also sought comments as to why balancing authorities should not be informed of UFLS program plans that directly impact balancing authority functions.

### **Comments**

82. NERC states that Reliability Standard EOP-003-2 removes requirements on UFLS design, incorporates them in Reliability Standard PRC-006-1, and assigns those activities to planning coordinators. NERC further states that EOP-003-2 does not remove any

requirements for UVLS, which are assigned to transmission operators. NERC maintains that, while balancing authorities contribute to managing Interconnection frequency by balancing load and generation resources in real-time, UFLS and UVLS programs are automatic and must be set in advance. NERC, however, agrees that balancing authorities should be informed of UFLS program plans that directly impact the balancing authority function.

83. EEI, TAPS, MISO, Dominion and NYISO largely support NERC's comments. EEI states that the changes in Reliability Standard EOP-003-2 are consistent with the roles and responsibilities of balancing authorities and transmission operators. EEI also maintains that balancing authorities are already informed of UFLS programs by transmission operators because balancing authorities and transmission operators "are specifically identified as coordinating other load shedding plans as identified in EOP-003-2" and to "effectively develop those plans [balancing authorities] and [transmission operators] must have knowledge of the UFLS programs of which [transmission operators] are intimately aware through PRC-006-1."<sup>52</sup>

84. TAPS states that Reliability Standards PRC-006-1 and EOP-003-2 clarify the requirements in the existing Reliability Standards and assign them to the functional entities best suited to program design. TAPS also states that Reliability Standard PRC-001-1, Requirement R1 ensures that balancing authorities are familiar with UFLS

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<sup>52</sup> EEI Comments at 13.

programs because the requirement provides that they “shall be familiar with the purpose and limitations of protection system schemes applied in its area.”<sup>53</sup>

85. MISO states that balancing authorities need not be informed of UFLS programs because planning coordinators are the functional entities tasked with overseeing those programs. MISO also contends that requiring planning coordinators to report to balancing authorities on UFLS programs would impose additional costs with little benefit to reliability. MISO notes, however, that balancing authorities could benefit if NERC periodically published prevailing UFLS set points by planning coordinator area.

86. Dominion states that planning coordinators should not be required to inform balancing authorities of UFLS program plans because balancing authorities have no role in the design and implementation of UFLS and have no action to take to affect the successful operation of UFLS.

87. NYISO comments that balancing authorities have no role in load shedding and agrees with the removal of UFLS references from Reliability Standard EOP-003-2.

88. SWPA states that balancing authorities, by definition, do not perform the functions referred to in Reliability Standards PRC-006-1 or EOP-003-2, Requirements R2, R4, and R7. However, SWPA believes that PRC-006-1 should incorporate language that ensures that balancing authorities are kept informed of UFLS program plans that directly impact the balancing authority functions.

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<sup>53</sup> TAPS Comments at 8-9.

### **Commission Determination**

89. The Commission accepts the elimination of requirements for balancing authorities in Reliability Standard EOP-003-2. NERC states in its comments that “all activities required for UFLS programs in the existing standards are incorporated into PRC-006-1, and are assigned to the Planning Coordinator,”<sup>54</sup> and that balancing authorities will still be made aware of UFLS programs in order to “be familiar with the purpose and limitations of protection system schemes applied in its area,”<sup>55</sup> as stated in Reliability Standard PRC-001-1, Requirement R1. To that end, the Commission believes that the comments address the questions raised in the NOPR regarding the elimination of balancing authority responsibility for Requirements R2, R4, and R7 of EOP-003-2.

#### **I. Violation Risk Factors and Violation Severity Levels**

90. In the NOPR, the Commission proposed to approve the VRFs and VSLs in Reliability Standards PRC-006-1 and EOP-003-2. However, the Commission sought comments on one VSL and one VRF for PRC-006-1.

91. The Commission stated that the “Lower VSL” assignment for Requirement R8 in PRC-006-1 applies when a UFLS entity fails to provide data to its planning coordinator for 5 to 10 calendar days following the schedule specified by the planning coordinator. The Commission noted in the NOPR that Requirement R8 of PRC-006-1 does not

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<sup>54</sup> NERC Comments at 13.

<sup>55</sup> NERC Comments at 14.

include a 5-day grace period for providing data to planning coordinators and thus the subject VSL assignment may be inconsistent with the Commission's VSL Guideline 3.

92. The Commission noted that NERC proposed a "Medium" VRF for Reliability Standard PRC-006-1, Requirement R5, which requires planning coordinators to coordinate their UFLS program design with other planning coordinators whose area is in part of the same identified island. The Commission observed the statement in NERC's petition that Requirement R5 is "not related to similar reliability goals in other standards."<sup>56</sup> However, the Commission explained that coordination of load shedding plans is required in a similar manner in Requirement R3 of currently-effective Reliability Standard EOP-003-1, which includes a VRF of "High."<sup>57</sup> The Commission stated that the lack of coordination of UFLS programs among planning coordinators within the same identified island could lead to ineffective UFLS operations and further cascading outages within the island when UFLS is activated. The Commission explained that this might be inconsistent with Guideline 3 of the Commission's VRF Guidelines states that "[a]bsent justification to the contrary, the Commission expects the assignment of Violation Risk Factors corresponding to Requirements that address similar reliability goals in different Reliability Standards would be treated comparably."<sup>58</sup>

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<sup>56</sup> NERC Petition at 46.

<sup>57</sup> Reliability Standard EOP-003-2 includes the same VRF assignment of "High" for Requirement R3.

<sup>58</sup> *North American Electric Reliability Corp.*, 119 FERC ¶ 61,145, at P 25 (2007).

**Comments**

93. NERC agrees with the NOPR regarding both the “Lower VSL” for Requirement R8 of Reliability Standard PRC-006-1 and the VRF for Requirement R5 of PRC-006-1. In its comments, NERC proposes to modify the “Lower VSL” to remove the phrase “more than 5 calendar days but” to address the concern stated in the NOPR. NERC also proposes to modify the VRF for Requirement R5 by raising it from “Medium” to “High.”
94. EEI, SWPA, and NYISO agree with the need to modify the VSL for Requirement R8 of PRC-006-1, consistent with NERC’s proposal. NYISO also supports changing the VRF for PRC-006-1, Requirement R5.

**Commission Determination**

95. Consistent with the proposal in NERC’s comments, the Commission directs the ERO to modify the language of the Lower VSL for Reliability Standard PRC-006-1, Requirement R8 and the Medium VRF for PRC-006-1, Requirement R5. NERC is directed to submit the revised VRF and VSL within 30 days of the effective date of this final rule.

**J. Implementation Plan and Effective Date**

96. In the NOPR, the Commission noted that NERC requests an effective date for Reliability Standards PRC-006-1 and EOP-003-2 of one year following the first day of the first calendar quarter after applicable regulatory approvals with respect to all Requirements of the proposed Reliability Standards *except* Parts 4.1 through 4.6 of Requirement R4 of PRC-006-1. With respect to Parts 4.1 through 4.6 of Requirement R4 of PRC-006-1, NERC requests an effective date of one year following the receipt of

generation data as required in Reliability Standard PRC-024-1,<sup>59</sup> but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approvals of PRC-006-1. The Commission sought comments about any potential reliability gaps that may occur during the development and implementation of PRC-024-1, such as how the planning coordinators will adequately determine and apply UFLS simulations and plans in the absence of generator trip settings.

### **Comments**

97. NERC maintains that there should not be a reliability gap because planning coordinators have access to and utilize trip settings in UFLS assessments. NERC explains its proposal by noting that generator owners currently cannot be compelled to provide trip settings to planning coordinators. NERC states that the implementation schedule defers a compliance obligation for planning coordinators to model the trip settings until a compliance obligation for generator owners to provide these settings exists.

98. EEI believes that a reliability gap will exist until draft Reliability Standard PRC-024-1 is approved, but it believes that the gap is minor and manageable. EEI agrees with NERC that information that will be mandated in PRC-024-1 is already supplied through mutual cooperation between entities. EEI states that the Commission might

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<sup>59</sup> Draft Reliability Standard PRC-024-1 addresses “Generator Performance During Frequency and Voltage Excursions” and is currently being developed in the NERC standard drafting process under Project 2007-09 (Generator Verification), which is one of NERC’s priority projects.

consider directing NERC to reevaluate its priority list to determine if the PRC-024-1 project is being given sufficient priority.

99. TAPS comments that planning coordinators have the ability to run UFLS simulations, even though modeling generator trip settings is not currently mandatory, because all significantly sized generators are included in models. TAPS contends that while some generators that trip outside of the UFLS set points may not be modeled, this will not have a significant impact on the reliability of the bulk electric system.

### **Commission Determination**

100. The Commission approves the implementation plan and effective dates of Reliability Standards PRC-006-1 and EOP-003-2. We agree with EEI that there is a reliability gap given the lack of mandatory requirements for providing generator trip settings, which will continue until draft Reliability Standard PRC-024-1 is approved. The Commission, however, also agrees with EEI that the gap is limited because the information mandated by PRC-024-1 is already supplied through mutual cooperation between utilities. To ensure that any gap pending implementation of PRC-024-1 remains limited, the Commission encourages the current practice of voluntarily sharing generator trip settings between entities to continue.

### **III. Information Collection Statement**

101. The Office of Management and Budget (OMB) regulations require that OMB approve certain reporting and recordkeeping (collections of information) imposed by an



agency.<sup>60</sup> Upon approval of a collection(s) of information, OMB will assign an OMB control number and expiration date. Respondents subject to the filing requirements of this rule will not be penalized for failing to respond to these collections of information unless the collections of information display a valid OMB control number.

102. The Commission is submitting these reporting and recordkeeping requirements to OMB for its review and approval under section 3507(d) of Paperwork Reduction Act of 1995.<sup>61</sup> The Commission solicited comments on the need for and the purpose of the information contained in Reliability Standard PRC-006-1 and EOP-003-2 and the corresponding burden to implement them. The Commission received comments on specific requirements in the Reliability Standards, which we address in this final rule. However, we did not receive any comments on our reporting burden estimates.

103. This final rule approves Reliability Standards PRC-006-1 and EOP-003-2, which would replace currently effective Reliability Standards PRC-007-0, PRC-009-0, EOP-003-1 and NERC-approved Reliability Standard PRC-006-0.<sup>62</sup> As noted previously, Reliability Standard PRC-006-0 was never approved by the Commission, and therefore

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<sup>60</sup> 5 CFR 1320.11.

<sup>61</sup> 44 U.S.C. 3507(d)

<sup>62</sup> PRC-006-0 was not approved by the Commission but remained effective as a NERC-approved standard (but not mandatory or enforceable). The other three standards were approved by the Commission. *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

has never been mandatory and enforceable. On the other hand, Reliability Standards PRC-007-0 and PRC-009-0 were approved by the Commission and are currently mandatory and enforceable. Because Proposed Reliability Standard PRC-006-1 incorporates the requirements from Reliability Standards PRC-006-0, PRC-007-0, and PRC-009-0 some of the existing requirements will become mandatory and enforceable (where previously they were voluntary), while others continue to be so. To properly account for the burden on respondents, the Commission will treat the burden resulting from NERC-approved Reliability Standard PRC-006-0 as essentially new to the industry, even though it is likely that most applicable entities have already been complying.<sup>63</sup>

104. The reporting requirements in Reliability Standard EOP-003-2 are virtually the same as those in currently effective Reliability Standard EOP-003-1. The difference is that Reliability Standard EOP-003-2 eliminates balancing authorities from Requirements R2 and from Measure M1.<sup>64</sup> This requirement and measure deal with establishing and documenting automatic load shedding plans.

105. Public Reporting Burden: Our estimate below regarding the number of respondents is based on the NERC compliance registry as of July 29, 2011. According to

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<sup>63</sup> This statement is made because currently effective Reliability Standards PRC-007-0 and PRC-009-0 required UFLS entities to follow the UFLS program implemented by Reliability Standard PRC-006-0. Therefore, it is likely that entities have already been following the requirements contained in Reliability Standard PRC-006-0.

<sup>64</sup> Balancing authorities are also removed from Requirements R4 and R7, but these do not have reporting requirements associated with them.

the NERC compliance registry, there are 72 planning coordinators and 126 balancing authorities. The individual burden estimates are based on the time needed to gather data, run studies, and analyze study results to design or update the UFLS programs.

Additionally, documentation and the review of UFLS program results by supervisors and management is included in the administrative estimations. These are consistent with estimates for similar tasks in other Commission approved standards.

PRC-006-1 (Automatic Underfrequency Load Shedding) <sup>65</sup>	Number of Respondents Annually (1)	Number of Responses per Respondent (2)	Average Burden Hours Per Response (3)	Total Annual Burden Hours (1)x(2)x(3)
PCs*: Design and document Automatic UFLS Program	72	1	120	8,640
PCs: Management Review of Documentation	72	1	40	2,880
PCs: Record Retention	72	1	16	1,152
Total				12,672
EOP-003-2 (Load Shedding Plans) <sup>66</sup>				

<sup>65</sup> Reliability Standard PRC-006-1 applies to both planning coordinators and to UFLS entities. However, the burden associated with the UFLS entities is not new because it was accounted for under Commission approved Reliability Standards PRC-007-0 and PRC-009-0.

<sup>66</sup> Transmission operators also have to comply with Reliability Standard EOP-003-2. Since the applicable reporting requirements (and associated burden) have not changed from the existing standard, these entities are not included here.

Removal of BAs* from Reporting Requirements in R2 and M1 (Burden Reduction)	126	1	Reporting	-10	-1260
	126	1	Record Retention	-1	-126
<b>Total</b>					-1,386
<b>Net Change in Burden (Total Annual Hours for Collection)</b>					11,286

\*PC=Planning Coordinator; BA=Balancing Authority

Total Net Annual Cost (Reporting + Record Retention)<sup>67</sup>: = \$1,414,656 - \$154,728 =  
\$1,259,928.

- Total Reporting Cost for Planning Coordinators: = 11,520 hours @ \$120/hour =  
\$1,382,400.
- Total Record Retention Cost for Planning Coordinators: 1,152 hours @ \$28/hour  
= \$32,256.
- Total Reporting and Record Retention Cost Savings for Balancing Authorities: =  
(1,260 hours @ \$120/hour) + (126 hours @ \$28/hour) = \$154,728.

Title: Mandatory Reliability Standards for the Bulk-Power System

Action: Proposed Collection FERC-725A.

OMB Control No.: 1902-0244.

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<sup>67</sup> The hourly reporting cost is based on the cost of an engineer to implement the requirements of the rule. The record retention cost comes from Commission staff research on record retention requirements.

Respondents: Businesses or other for-profit institutions; not-for-profit institutions.

Frequency of Responses: On Occasion.

Necessity of the Information: This Final Rule approves the requested modifications to Reliability Standards pertaining to automatic underfrequency load shedding. The Reliability Standards help ensure the reliable operation of the bulk electric system by arresting declining frequency and assisting recovery of frequency following system events leading to frequency degradation.

Internal Review: The Commission has reviewed the Reliability Standards and made a determination that its action is necessary to implement section 215 of the FPA. These requirements, if accepted, should conform to the Commission's expectation for UFLS programs as well as procedures within the energy industry.

106. Interested persons may obtain information on the reporting requirements by contacting the following: Federal Energy Regulatory Commission, 888 First Street, NE Washington, DC 20426 [Attention: Ellen Brown, Office of the Executive Director, e-mail: [DataClearance@ferc.gov](mailto:DataClearance@ferc.gov), phone: (202) 502-8663, fax: (202) 273-0873].

107. For submitting comments concerning the collection(s) of information and the associated burden estimate(s), please send your comments to the Commission and to the Office of Management and Budget, Office of Information and Regulatory Affairs, Washington, DC 20503 [Attention: Desk Officer for the Federal Energy Regulatory Commission, phone: (202) 395-4638, fax: (202) 395-7285]. For security reasons, comments to OMB should be submitted by e-mail to: [oir\\_submission@omb.eop.gov](mailto:oir_submission@omb.eop.gov).

Comments submitted to OMB should include Docket Number RM11-20 and OMB Control Number 1902-0244.

#### **IV. Environmental Analysis**

108. The Commission is required to prepare an Environmental Assessment or an Environmental Impact Statement for any action that may have a significant adverse effect on the human environment.<sup>68</sup> The Commission has categorically excluded certain actions from this requirement as not having a significant effect on the human environment. Included in the exclusion are rules that are clarifying, corrective, or procedural or that do not substantially change the effect of the regulations being amended.<sup>69</sup> The actions proposed here fall within this categorical exclusion in the Commission's regulations.

#### **V. Regulatory Flexibility Act**

109. The Regulatory Flexibility Act of 1980 (RFA)<sup>70</sup> generally requires a description and analysis of final rules that will have significant economic impact on a substantial number of small entities. The RFA mandates consideration of regulatory alternatives that accomplish the stated objectives of a proposed rule and that minimize any significant economic impact on a substantial number of small entities. The Small Business Administration's (SBA) Office of Size Standards develops the numerical definition of a

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<sup>68</sup> *Regulations Implementing the National Environmental Policy Act of 1969*, Order No. 486, 52 FR 47897 (Dec. 17, 1987), FERC Stats. & Regs., Regulations Preambles 1986-1990 ¶ 30,783 (1987).

<sup>69</sup> 18 CFR 380.4(a)(2)(ii).

<sup>70</sup> 5 U.S.C. 601-612.

small business.<sup>71</sup> The SBA has established a size standard for electric utilities, stating that a firm is small if, including its affiliates, it is primarily engaged in the transmission, generation and/or distribution of electric energy for sale and its total electric output for the preceding twelve months did not exceed four million megawatt hours.<sup>72</sup>

110. Reliability Standard PRC-006-1 establishes design, assessment, and documentation requirements for automatic UFLS programs. It will be applicable to planning coordinators and entities that are responsible for the ownership, operation, or control of UFLS equipment. Reliability Standard EOP-003-2 removes balancing authorities from having to comply with Requirement R2 and Measure M1 of the standard. Comparison of the NERC compliance registry with data submitted to the Energy Information Administration on Form EIA-861 indicates that perhaps as many as 8 small entities are registered as planning coordinators and 18 small entities are registered as balancing authorities. The Commission estimates that the small planning coordinators to whom the Reliability Standard will apply will incur compliance and recordkeeping costs of \$157,184 (\$19,648 per planning coordinator) associated with the Standard's requirements. The small balancing authorities will receive a savings of \$154,728 (\$8,596 per balancing authority). Accordingly, Reliability Standards PRC-006-1 and EOP-003-2

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<sup>71</sup> 13 CFR 121.101.

<sup>72</sup> 13 CFR 121.201, Sector 22, Utilities & n.1.

should not impose a significant operating cost increase or decrease on the affected small entities.

111. Based on this understanding, the Commission certifies that these Reliability Standards will not have a significant economic impact on a substantial number of small entities. Accordingly, no regulatory flexibility analysis is required.

## **VI. Document Availability**

112. In addition to publishing the full text of this document in the Federal Register, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the Internet through FERC's Home Page (<http://www.ferc.gov>) and in FERC's Public Reference Room during normal business hours (8:30 a.m. to 5:00 p.m. Eastern time) at 888 First Street, N.E., Room 2A, Washington DC 20426.

113. From FERC's Home Page on the Internet, this information is available on eLibrary. The full text of this document is available on eLibrary in PDF and Microsoft Word format for viewing, printing, and/or downloading. To access this document in eLibrary, type the docket number excluding the last three digits of this document in the docket number field.

114. User assistance is available for eLibrary and the FERC's website during normal business hours from FERC Online Support at 202-502-6652 (toll free at 1-866-208-3676) or email at [ferconlinesupport@ferc.gov](mailto:ferconlinesupport@ferc.gov), or the Public Reference Room at (202) 502-8371, TTY (202)502-8659. E-mail the Public Reference Room at [public.referenceroom@ferc.gov](mailto:public.referenceroom@ferc.gov).



**VII. Effective Date and Congressional Notification**

115. These regulations are effective [insert date 60 days from publication in Federal Register]. The Commission has determined, with the concurrence of the Administrator of the Office of Information and Regulatory Affairs of OMB, that this rule is not a “major rule” as defined in section 351 of the Small Business Regulatory Enforcement Fairness Act of 1996.

List of Subjects in 18 CFR Part 40

Electric power; Electric utilities; Reporting and record keeping requirements.

By the Commission.

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

**Appendix  
Commenters**

<b>Abbreviation</b>	<b>Commenter</b>
Dominion	Dominion Resources Services, Inc.
EEI	Edison Electric Institute
EPSA	Electric Power Supply Association
FRCC	Florida Reliability Coordinating Council, Inc.
G&T Cooperatives	Associated Electric Cooperative, Inc.; Basin Electric Power Cooperative; and Tri-State Generation and Transmission Association, Inc.
KCP&L	Kansas City Power & Light Company and KCP&L Greater Missouri Operations Company
MISO	Midwest Independent Transmission System Operator, Inc.
NERC	North American Electric Reliability Corporation
NYISO	New York Independent System Operator, Inc.
PSEG	Public Service Electric and Gas Company; PSEG Power LLC; PSEG Energy Resources & Trade LLC
SWPA	Southwestern Power Administration
TAPS	Transmission Access Policy Study Group
Wisconsin Electric	Wisconsin Electric Power Company

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